

J-turn Intersection US 2 & ND 18

Grant Levi – Director

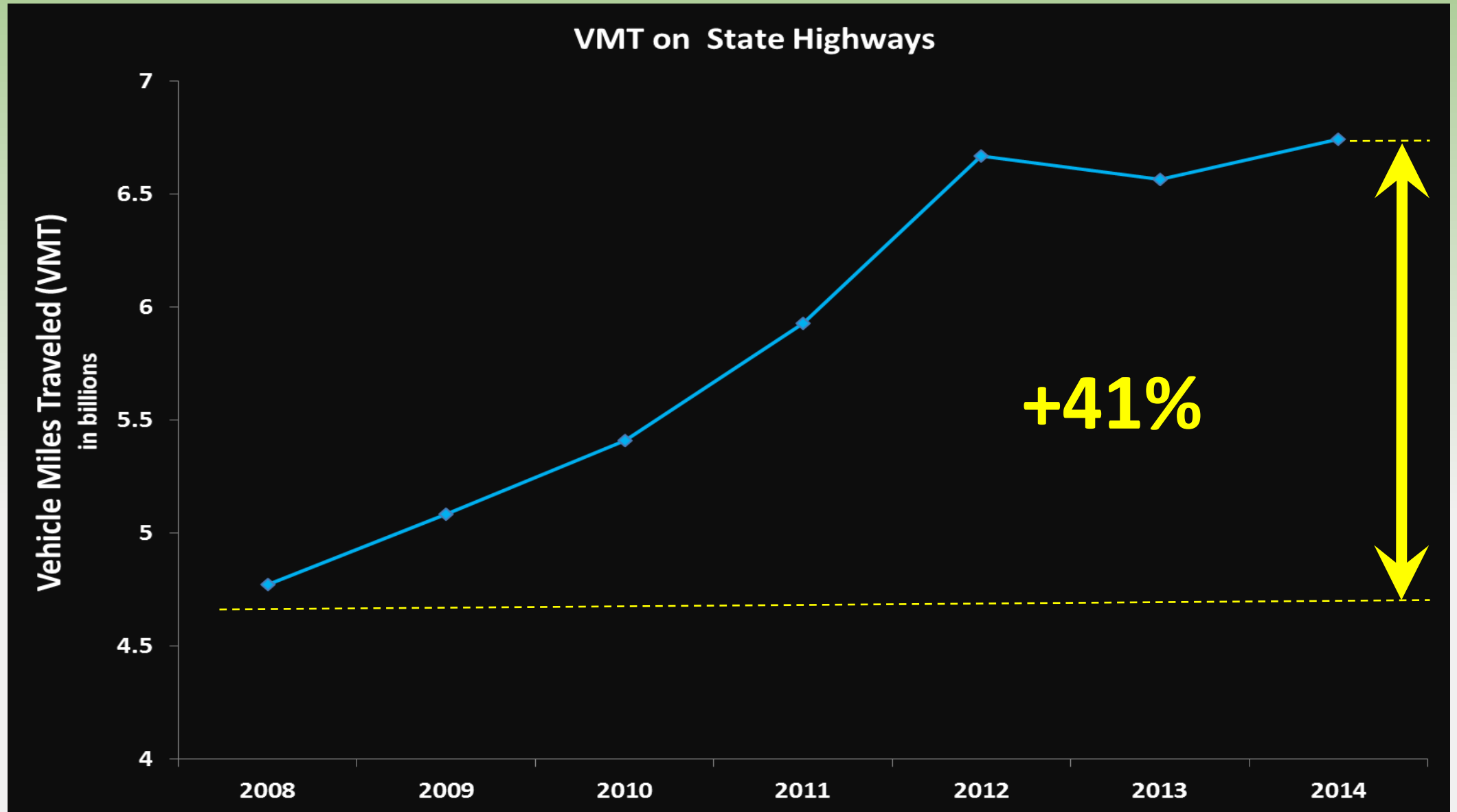
Ron Henke - Deputy Director for Engineering



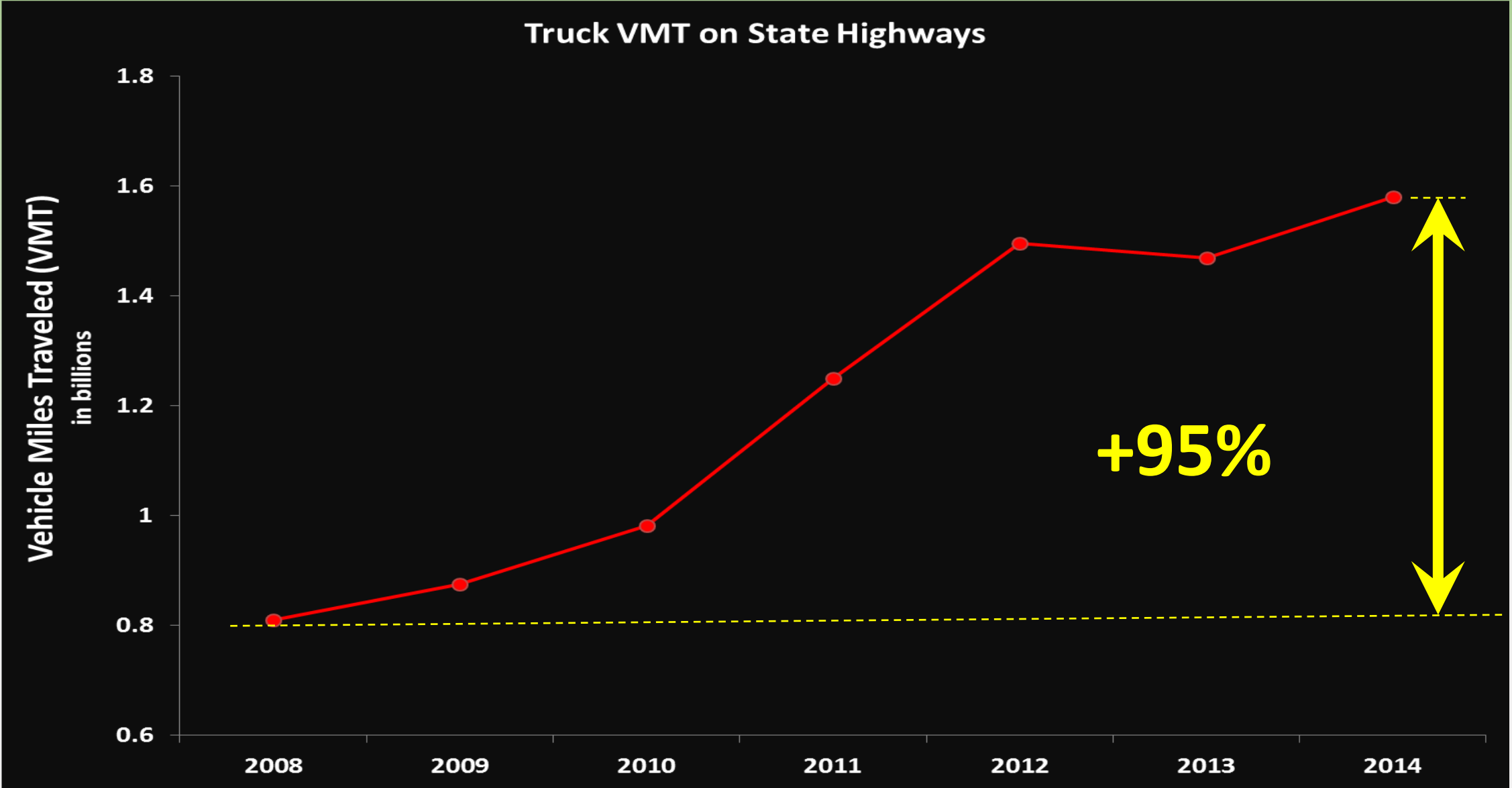
Mission

“Safely Move People and Goods”

All Traffic – State Highways from 2008 - 2014

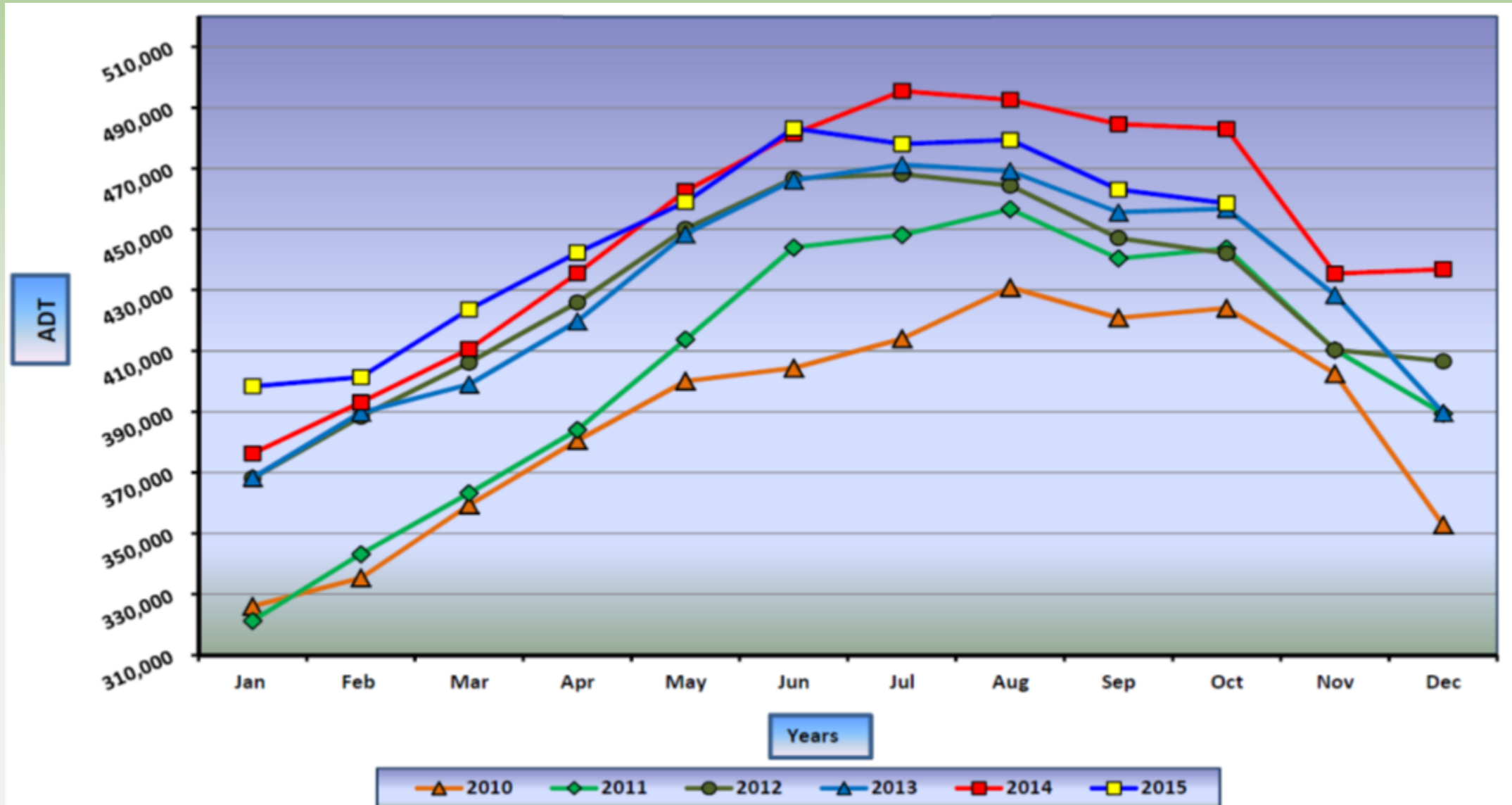


Truck Traffic on State Highways from 2008-2014



All Vehicle Traffic

- The Average Daily Traffic (ADT) Count chart below illustrates traffic counts in 2015 – see blue line with yellow markers.

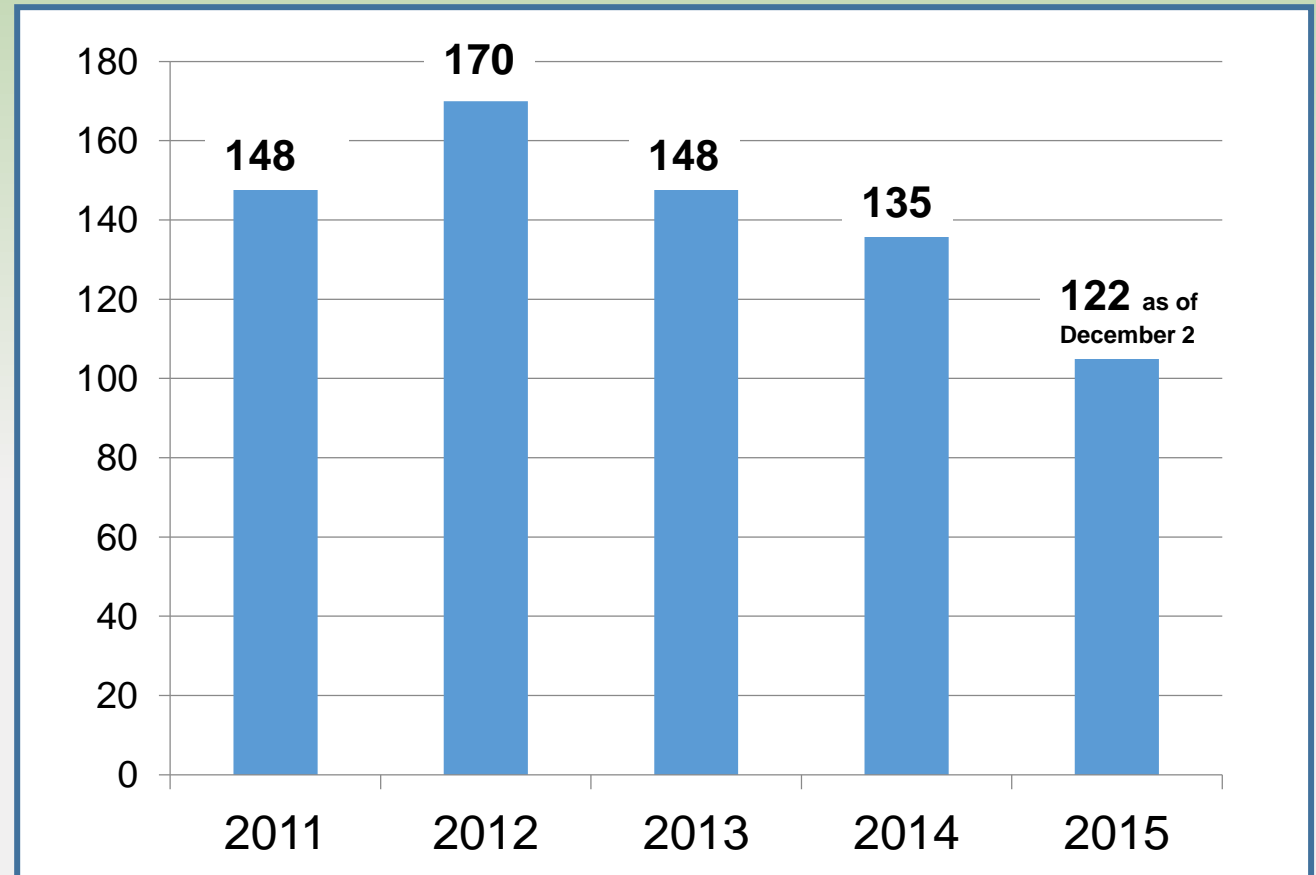


Traffic Safety

The number of traffic related deaths in state declined from 148 in 2013 to 135 in 2014.

- **Primary contributing factors to fatal crashes:**

- ✓ Alcohol
- ✓ Not using seatbelts
- ✓ Speed



Traffic Fatalities

Traffic Safety

Number of severe crashes includes fatal motor vehicle crashes and crashes that involve incapacitating injuries.

Year	# of Fatal (K) Crashes	# of Incapacitating (A) Crashes	TOTAL Severe Crashes (K+A)
2011	130	406	536
2012	147	487	634
2013	133	445	578
2014	121	433	554
2015 (to date)	102	401	503

NDDOT Commitment to Safety

Highway Safety Improvement Program

- **Local Road Safety Program**
- **High Crash Location Study**

US 2 and ND 18 Intersection identified as a high crash location

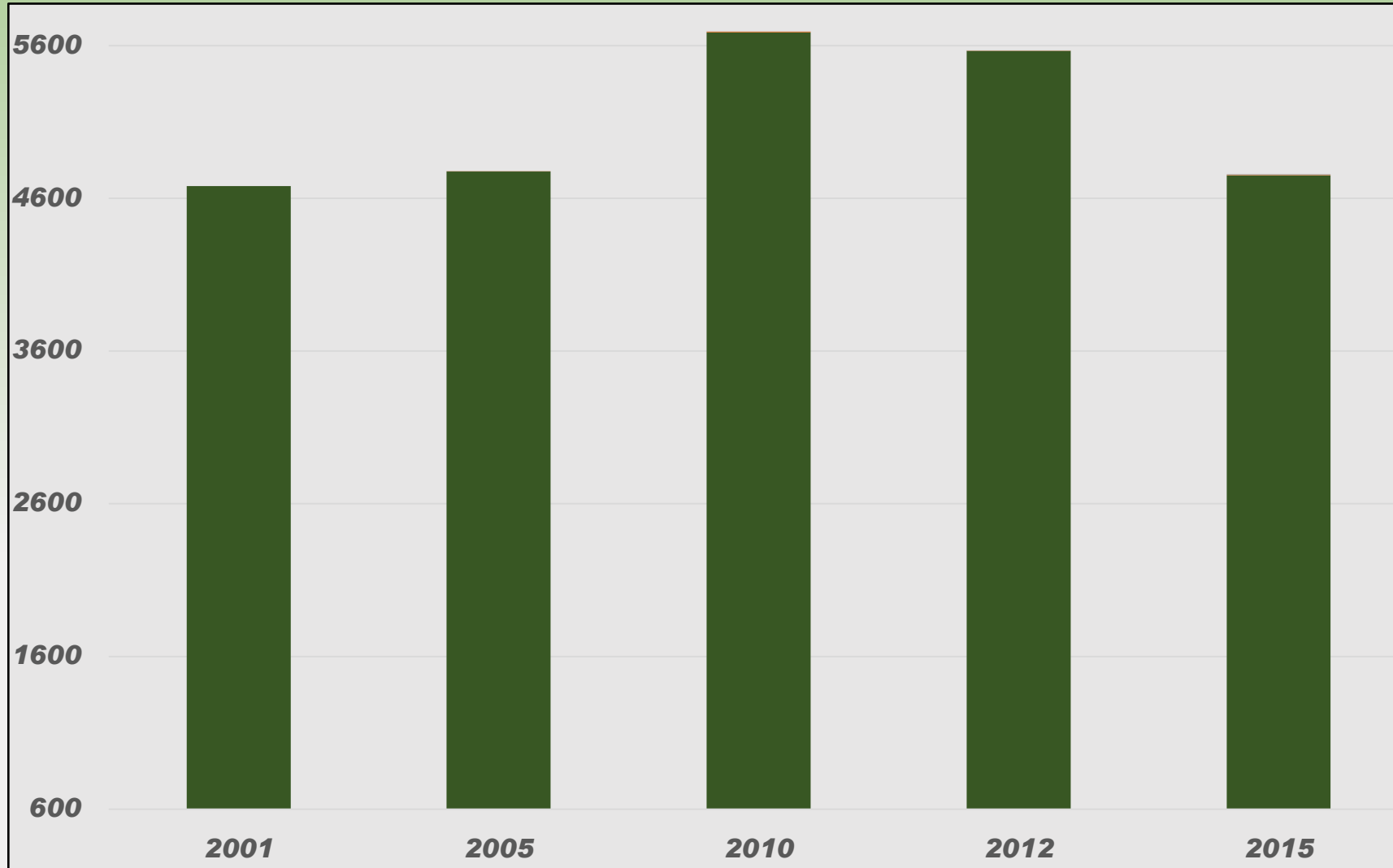
- Here today to find a solution
- North Dakota Highway Patrol troopers conducted a right-of-way detail on November 20, 2015 using the department's aircraft.
 - During the 2-hour detail, nine citations were issued for disregarding stop signs.

Video of Traffic at ND 18 and US 2 Intersection – click on image below to watch video





Traffic at US 2/ND 18 Intersection



Crash History

US 2

US 2

ND 18

Crash Type

- A Angle
- S Sideswipe
- R Rear-end
- P Pedestrian
- X Single vehicle (run off the road)

Crash Severity

- PDO
- Possible Injury
- Non-incapacitating injury
- Incapacitating injury
- Fatal

Crash History

9/27/02 Fatal Crash: Vehicle going north stopped for stop sign then failed to yield in the median, struck by westbound vehicle

6/18/99 Fatal Crash: Pedestrian crossing east leg of intersection from south side struck by eastbound vehicle

Crash Type

- A Angle
- S Sideswipe
- R Rear-end
- P Pedestrian
- X Single vehicle (run off the road)

Crash Severity

- PDO
- Possible Injury
- Non-incapacitating injury
- Incapacitating injury
- Fatal



Crash History

7/28/14 incapacitating injury crash: vehicle traveling southbound failed to yield and was struck by an eastbound vehicle

9/2/10 incapacitating injury crash: Northbound vehicle came to a stop then proceeded into the intersection and struck an eastbound semi-truck

US 2

US 2

ND 18

ND 18

Crash Type		Crash Severity	
A	Angle	●	PDO
S	Sideswipe	●	Possible Injury
R	Rear-end	●	Non-incapacitating injury
P	Pedestrian	●	Incapacitating injury
X	Single vehicle (run off the road)	●	Fatal

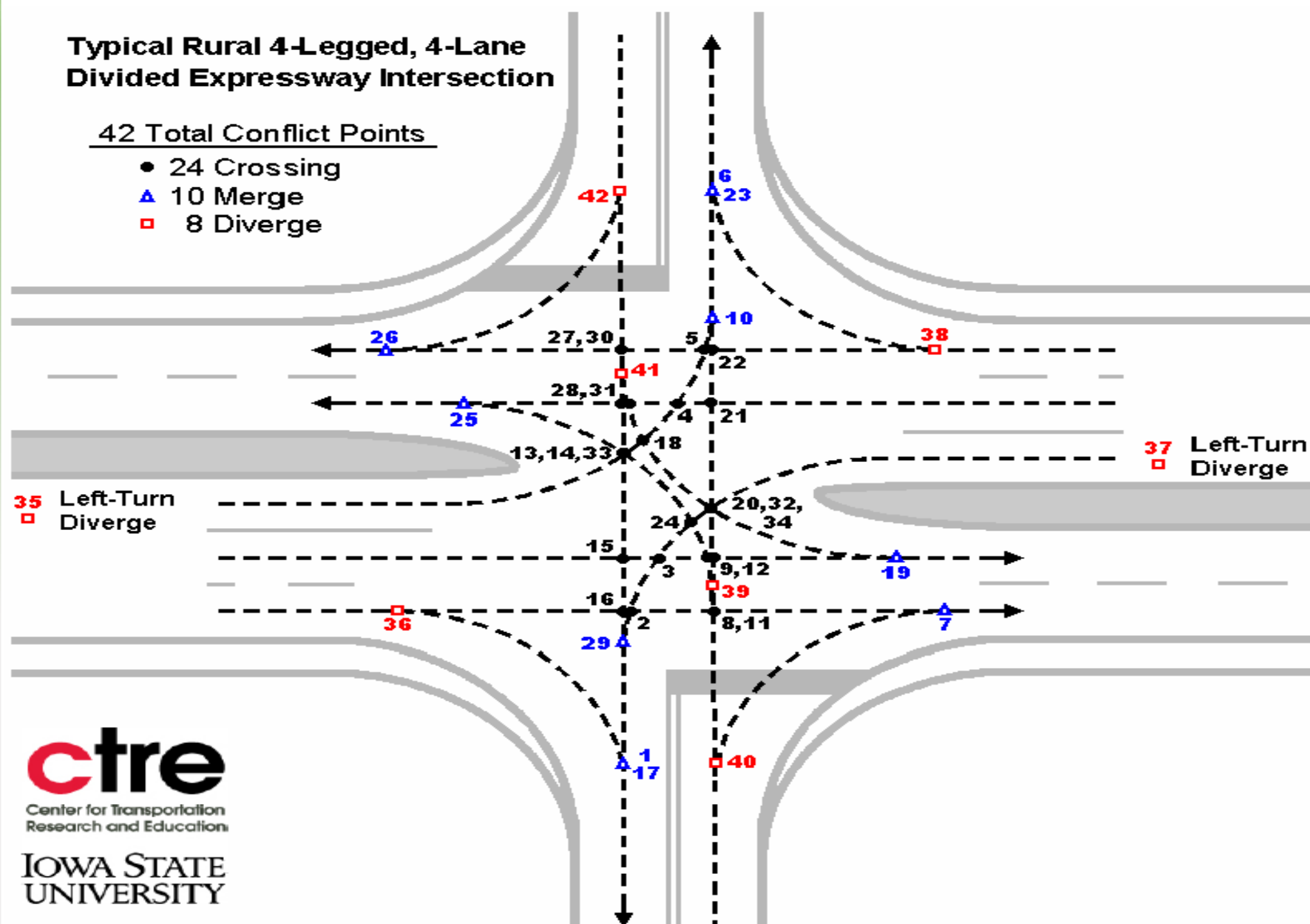
Safety Guidelines

- **Encourage DOTs to consider alternative geometric intersection and interchange designs, which are specifically designed to reduce or alter conflict points.**
- **Right angle collisions are the predominant crash type at conventional two-way stop controlled rural expressway intersections.**

Typical Rural 4-Legged, 4-Lane Divided Expressway Intersection

42 Total Conflict Points

- 24 Crossing
- ▲ 10 Merge
- 8 Diverge



An aerial photograph of a road intersection. A green rectangular box is overlaid on the top half of the image, containing the text 'Options Researched'. Below it, a dark green rectangular box contains the text 'Do Nothing' and a bullet point '• No safety improvement'. The background shows a road intersection with a road labeled 'ND 13' running vertically and 'US 2' running horizontally. There are trees, fields, and some buildings visible in the landscape. A compass rose is in the top right corner.

Options Researched

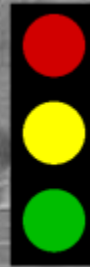
Do Nothing

- No safety improvement**

Options Researched

Traffic Signal

- Increased traffic delay
- Impacts US 2 traffic flow
- Does not meet requirements



Options Researched

Intersection Conflict Warning System (Beacons)

- Does not reduce conflict points



Options Researched

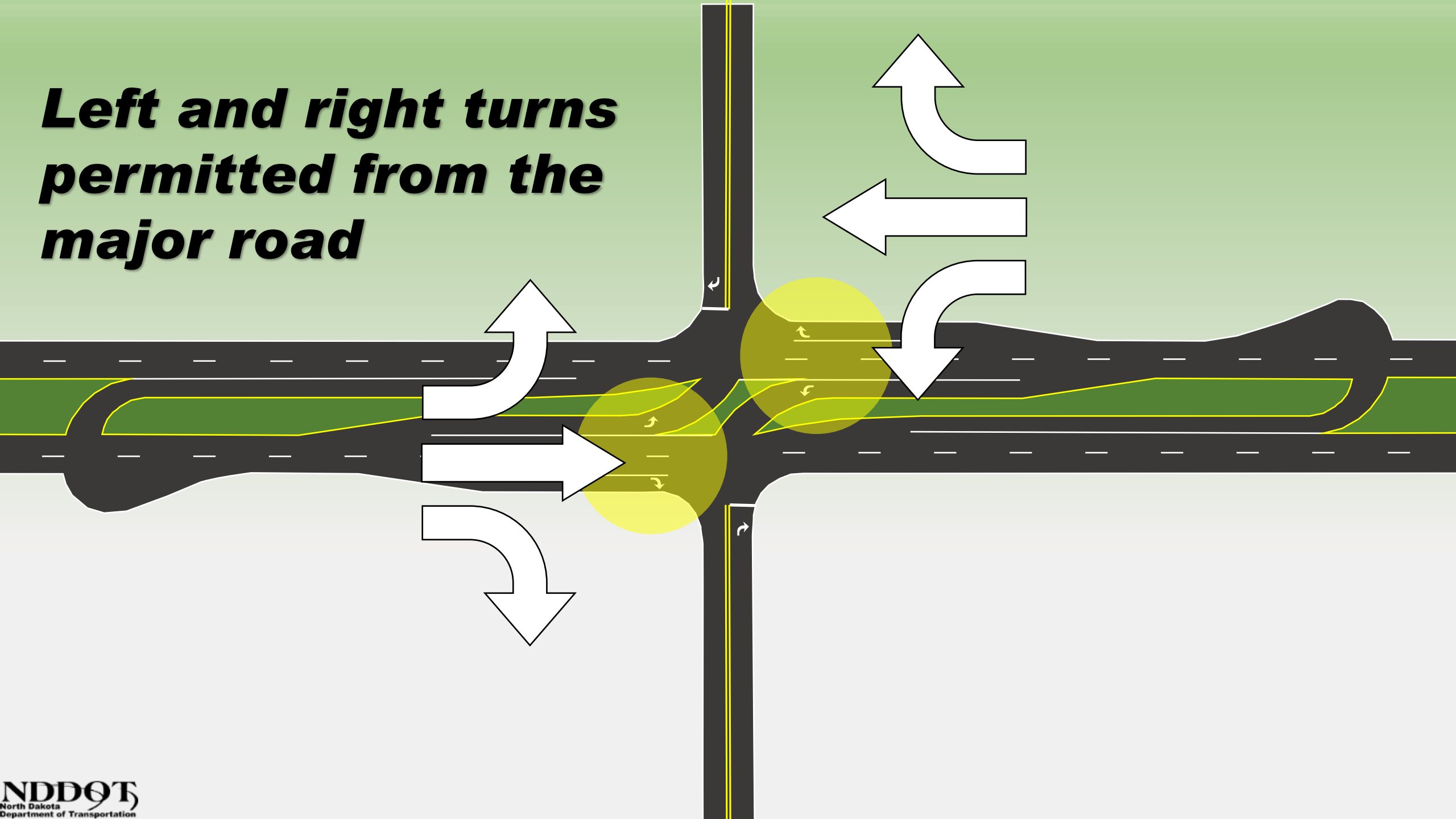
The J-Turn Intersection reduces the total number of intersection conflict points from 42 to 24.

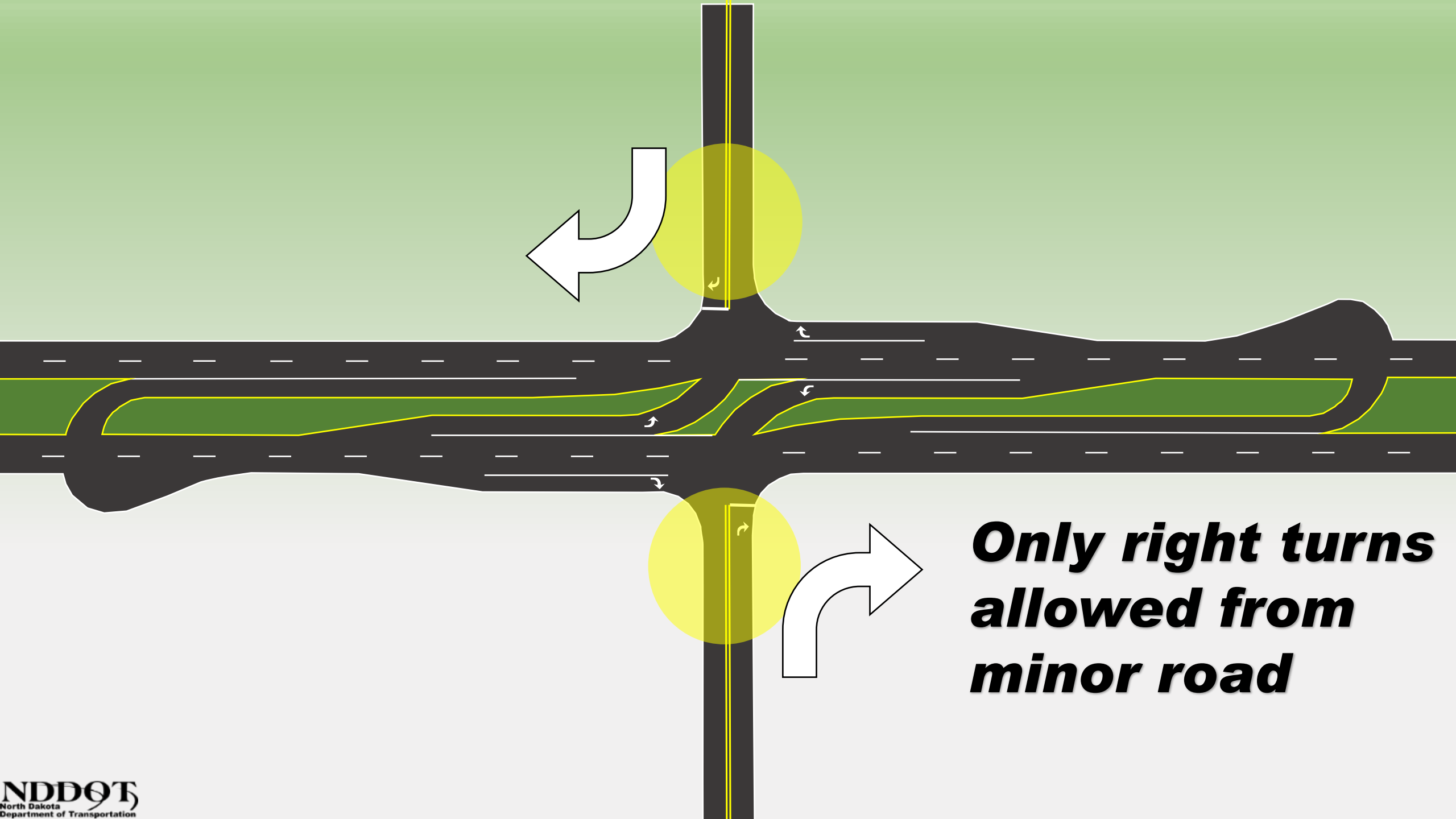
24 Total Conflict Points

- ★ 4 Crossing
- 20 Merge/Diverge (10 Each)

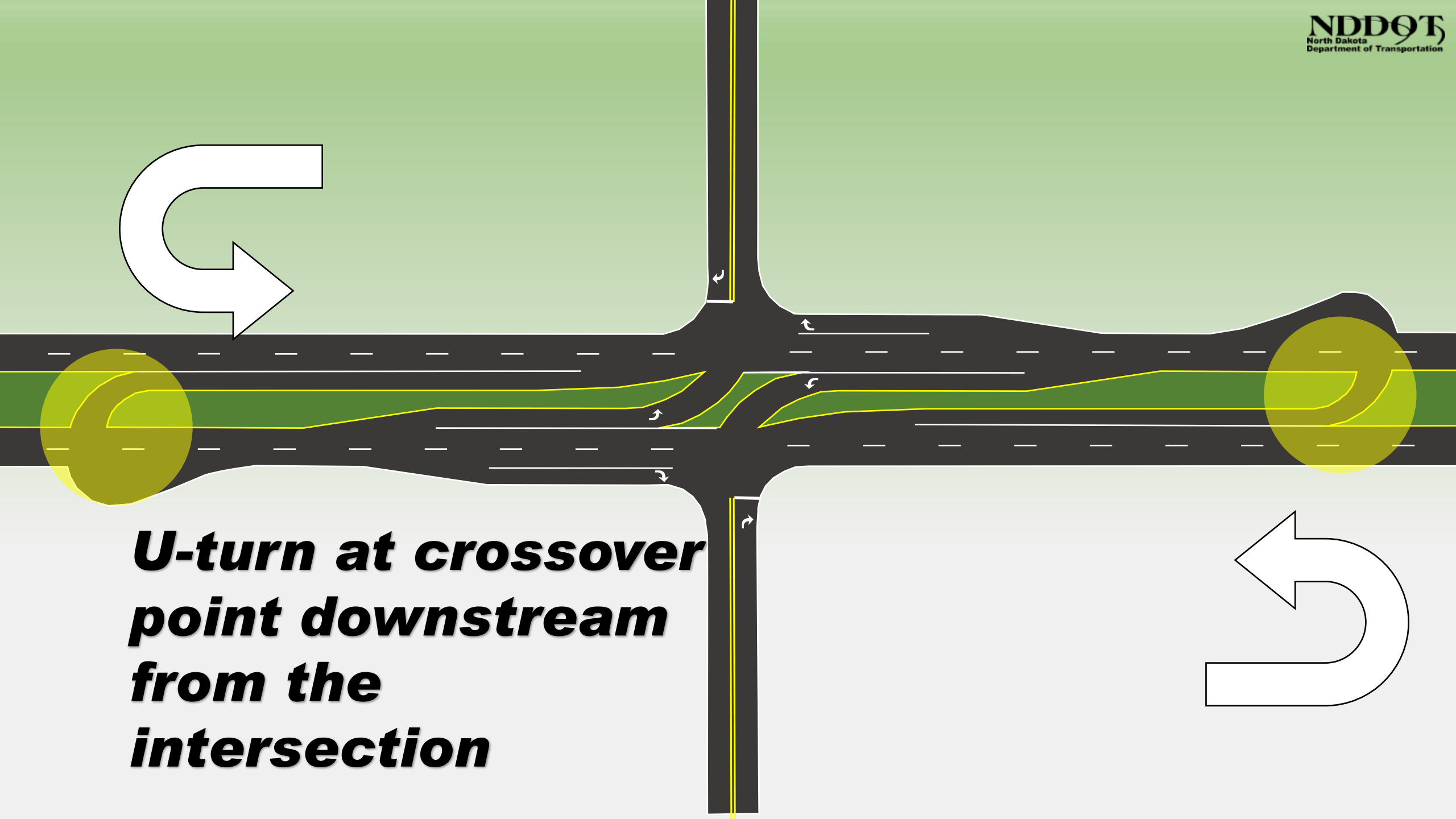


***Left and right turns
permitted from the
major road***

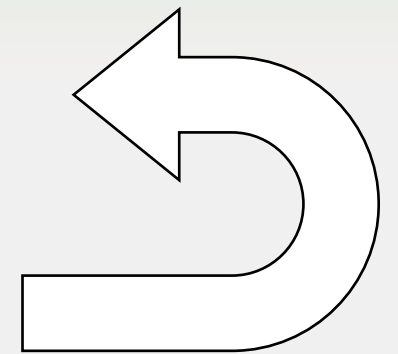


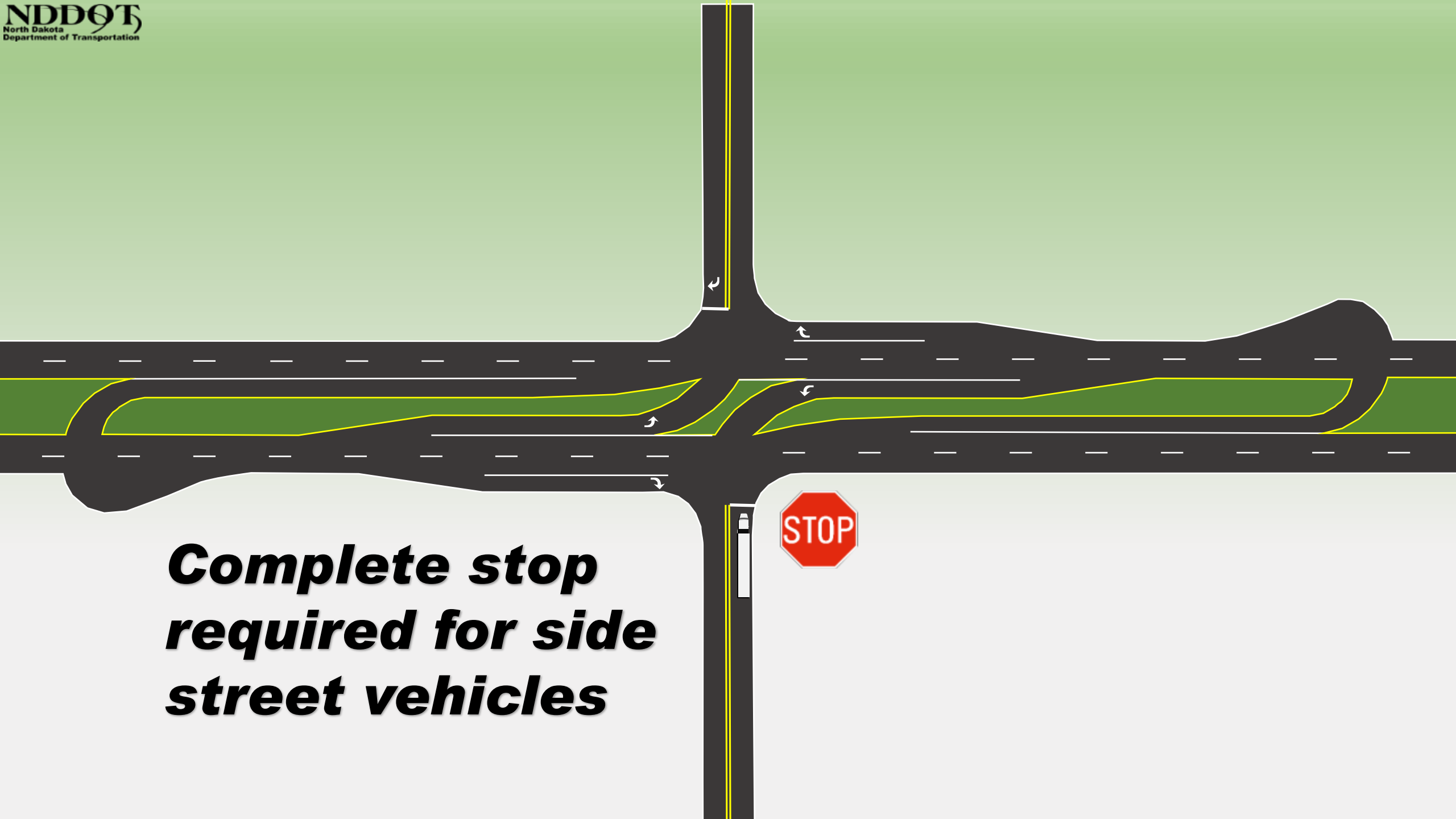


***Only right turns
allowed from
minor road***

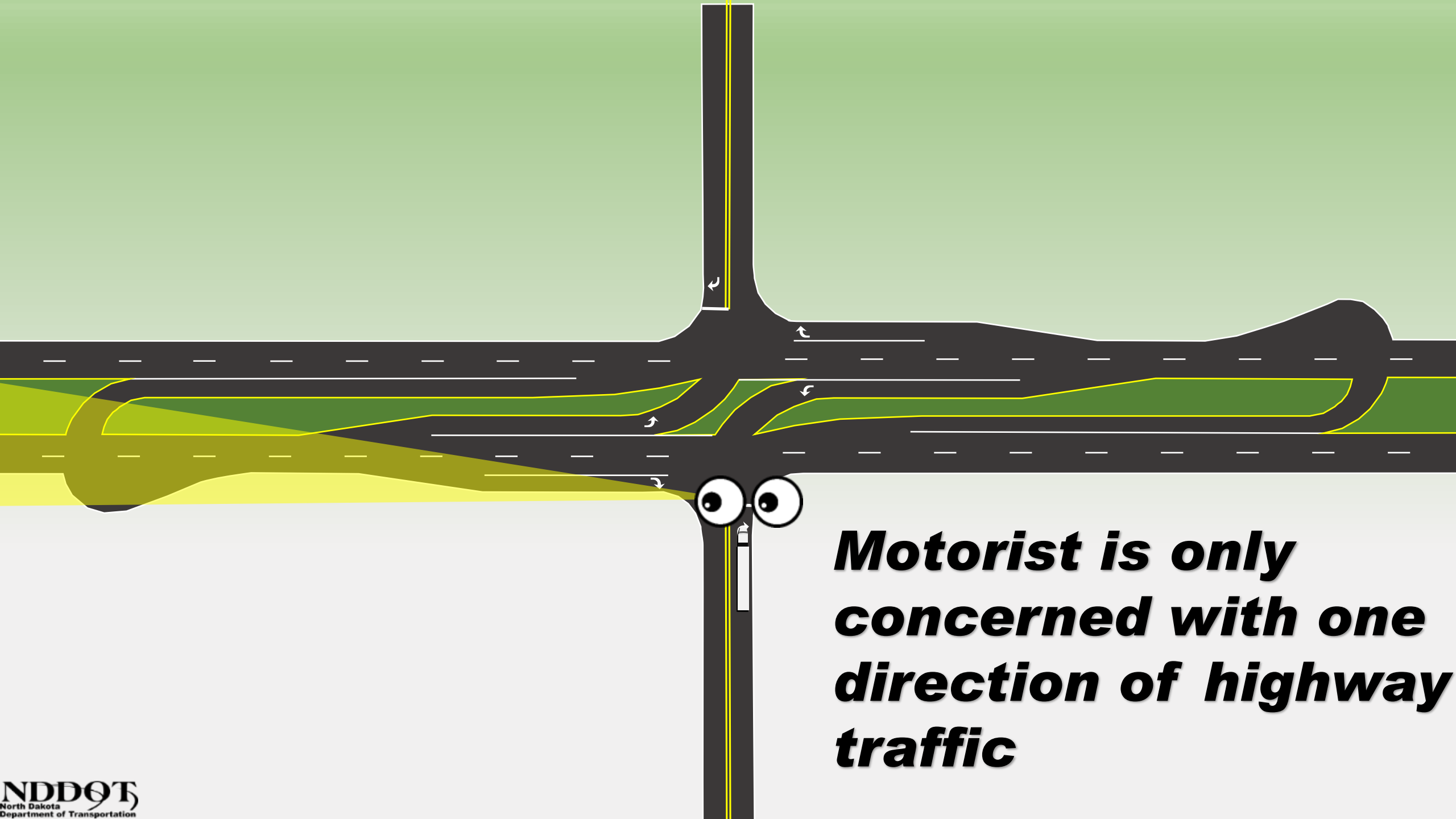


***U-turn at crossover
point downstream
from the
intersection***

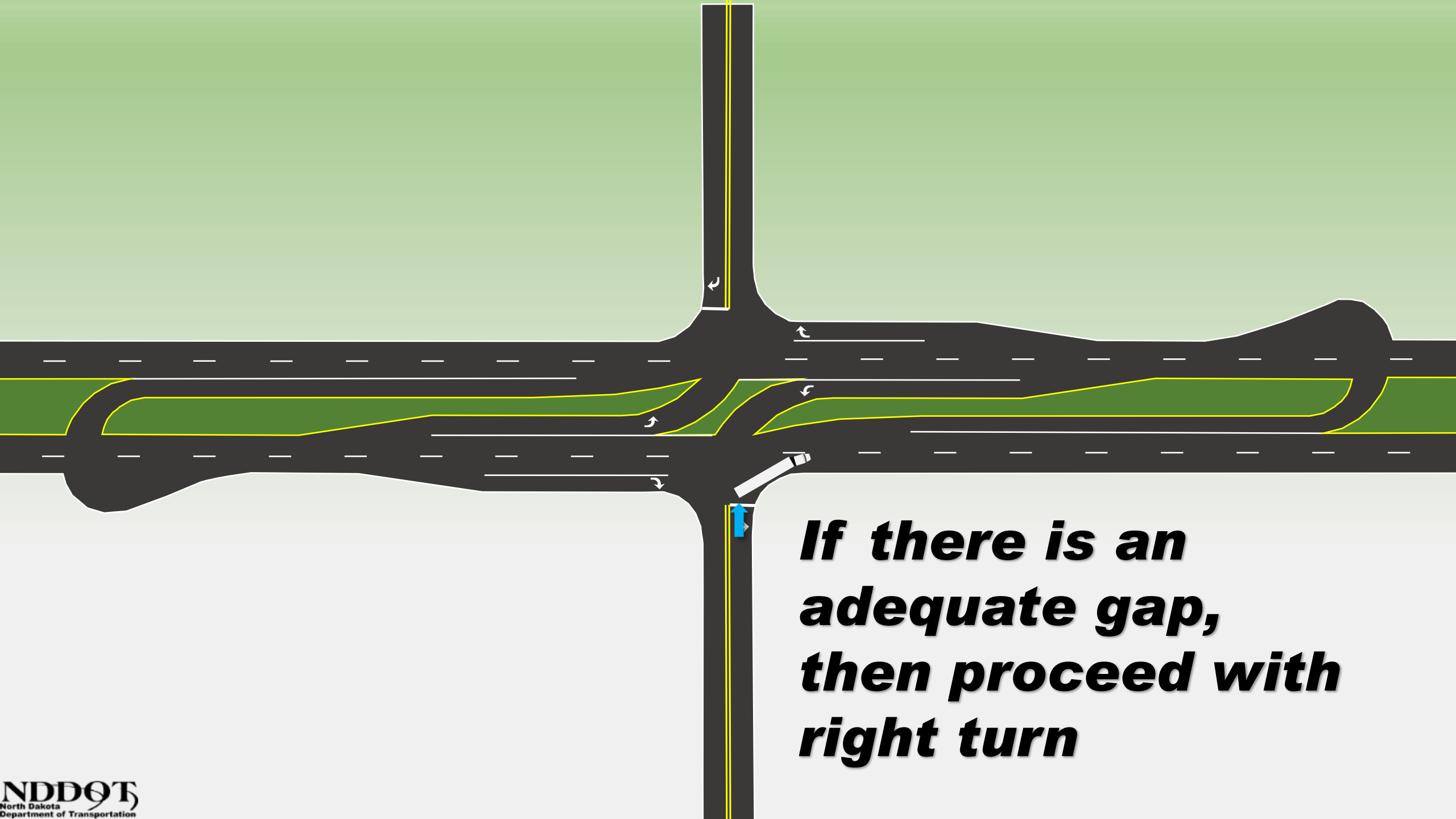




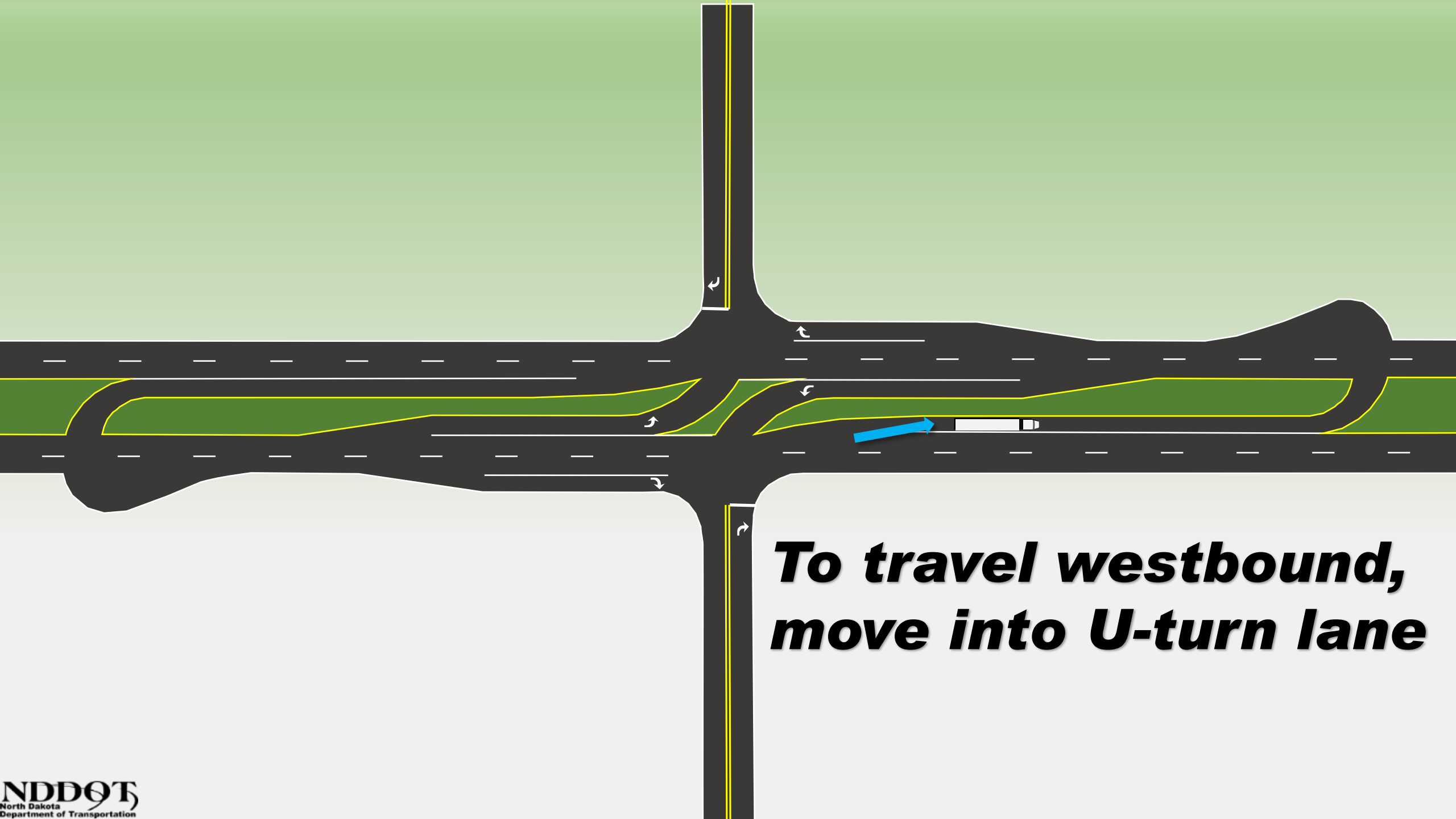
***Complete stop
required for side
street vehicles***



***Motorist is only
concerned with one
direction of highway
traffic***



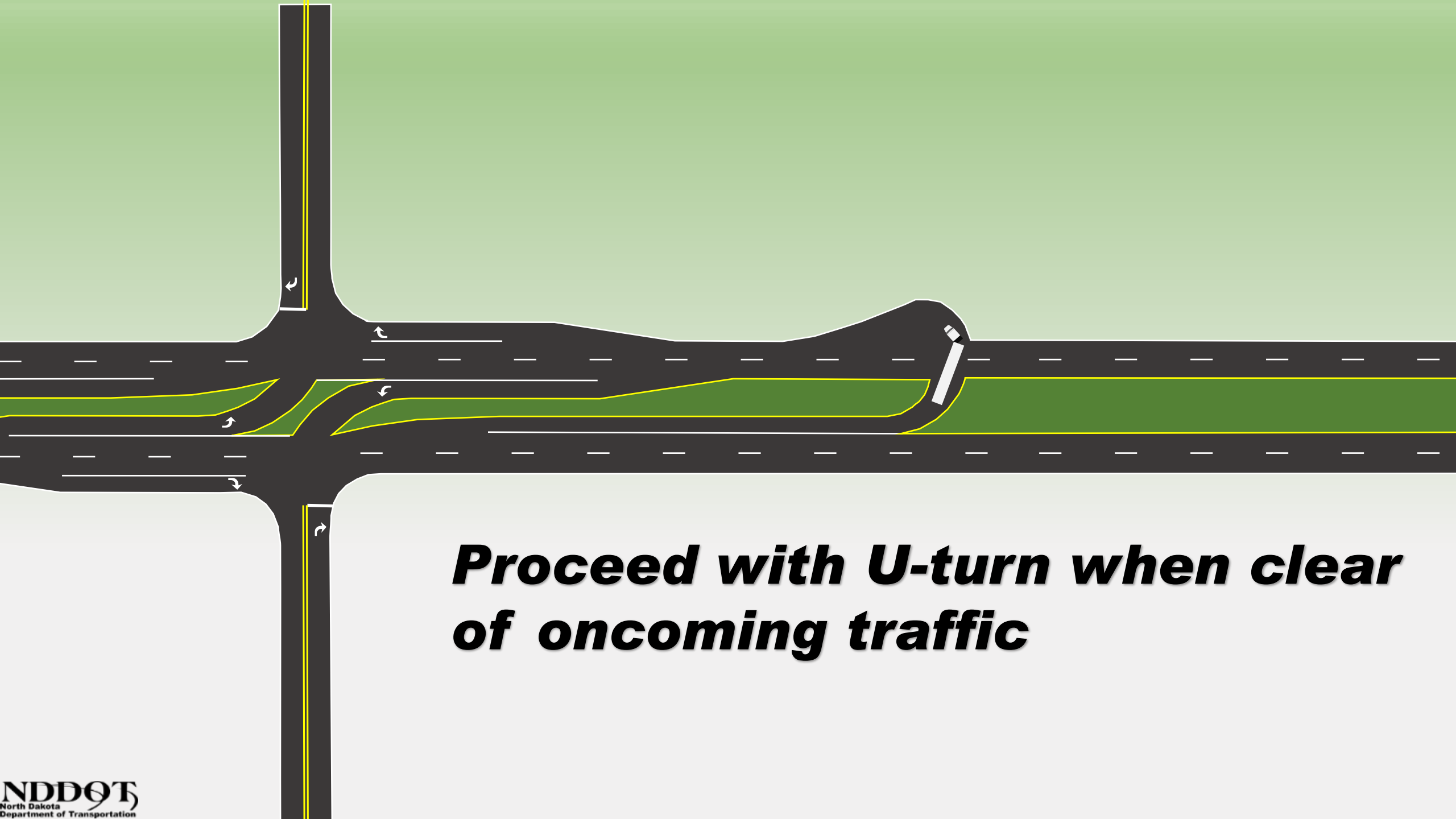
***If there is an
adequate gap,
then proceed with
right turn***



***To travel westbound,
move into U-turn lane***

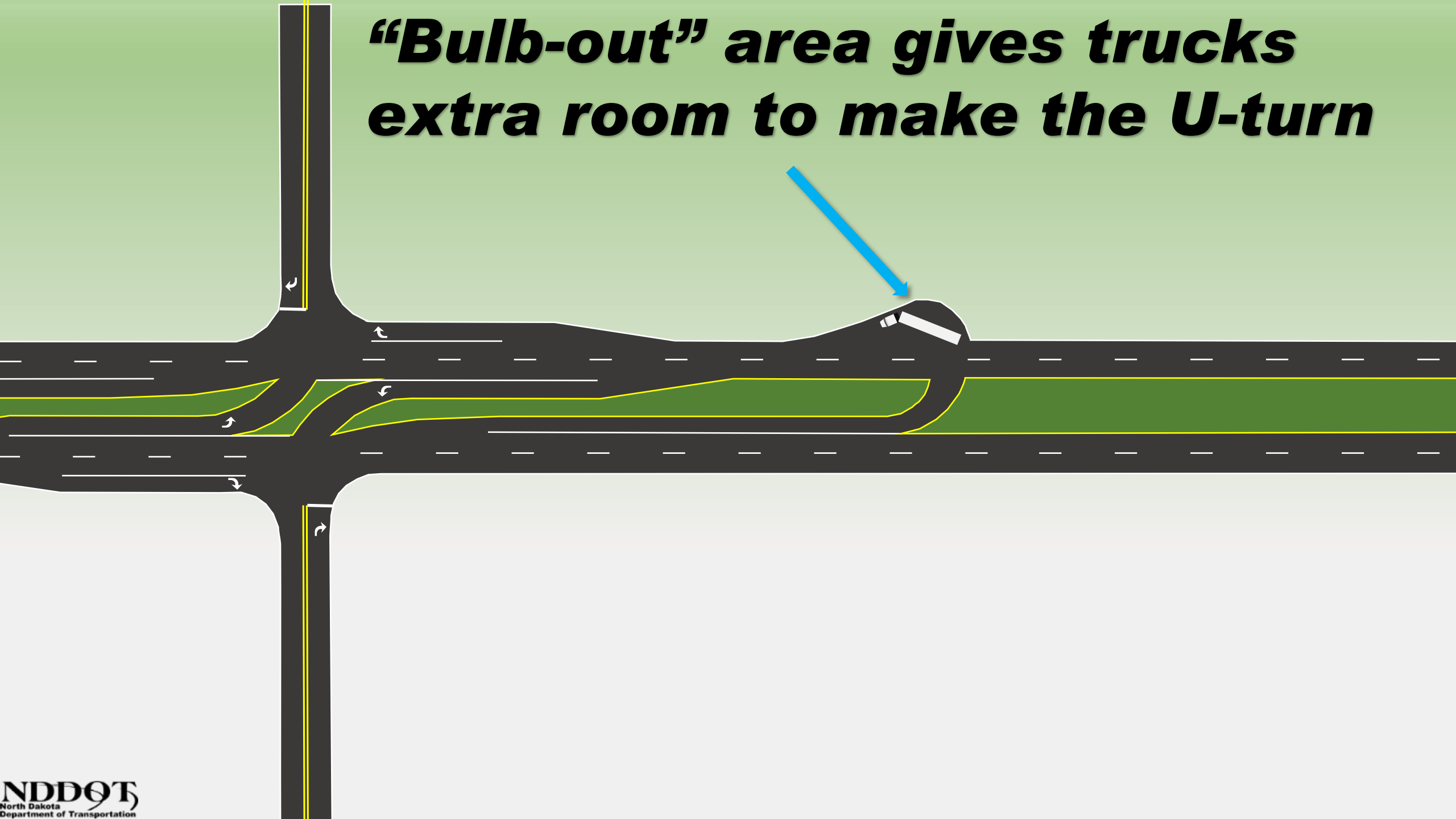


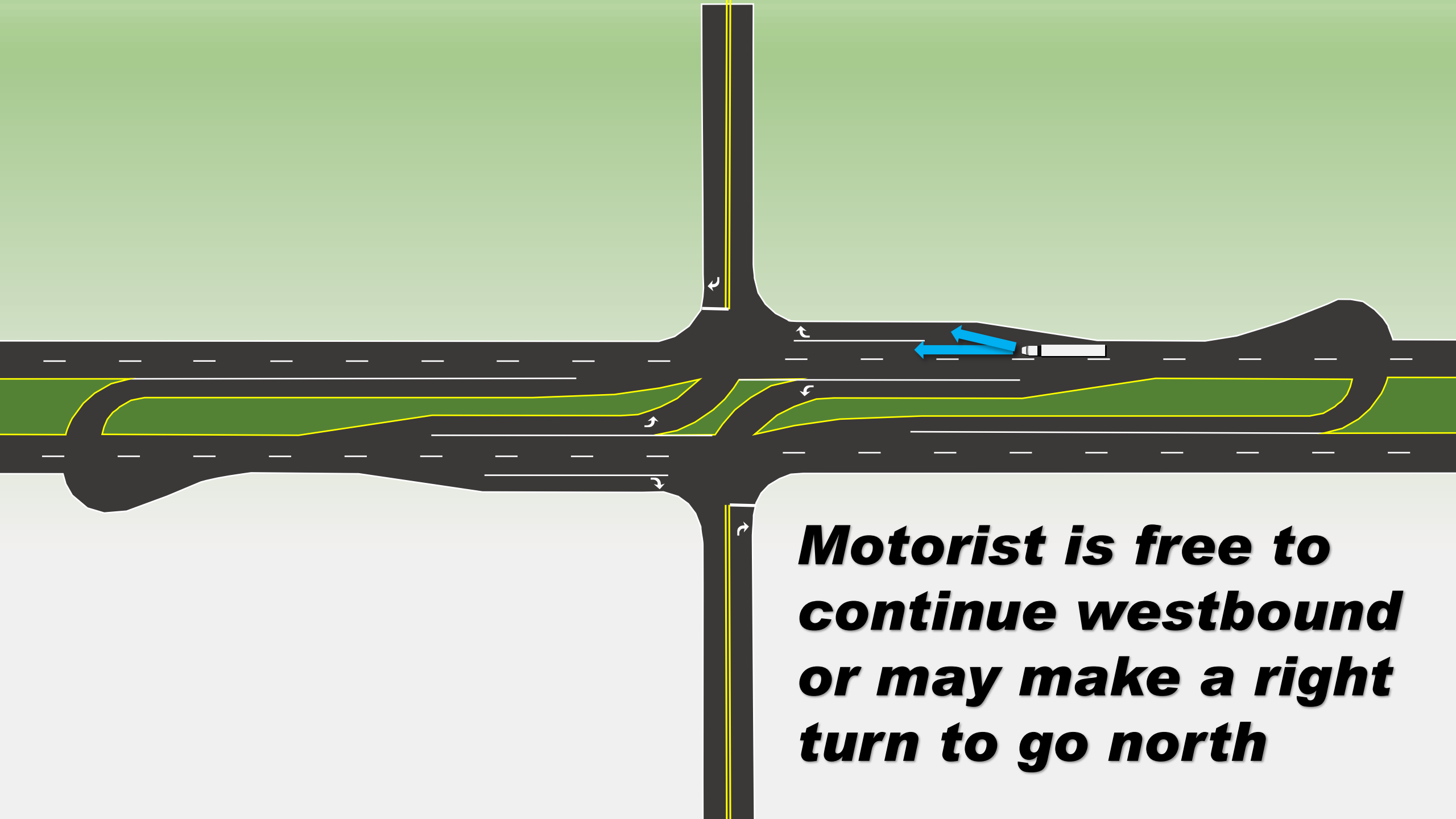
Again, the motorist is only concerned with one direction of highway traffic



***Proceed with U-turn when clear
of oncoming traffic***

***“Bulb-out” area gives trucks
extra room to make the U-turn***



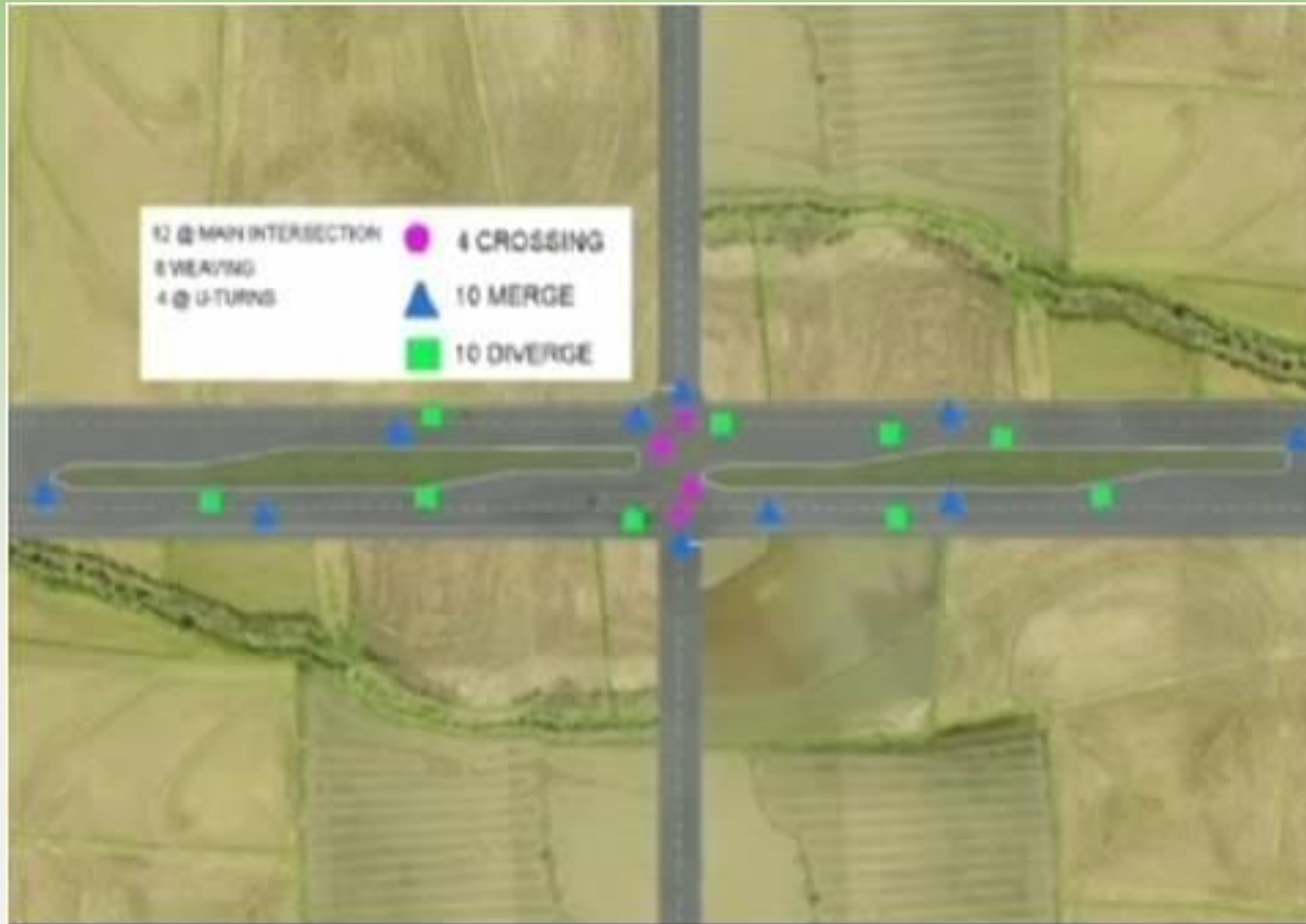


***Motorist is free to
continue westbound
or may make a right
turn to go north***

J-Turn Traffic – click on image below to watch video



Truck Driver talking about J-Turns – click on image below to watch video



Belle Plaine, MN

2250

16800

18000

3650



Columbia, MO

18775

Columbia, MO



Superior, WI

1100

5200

6400

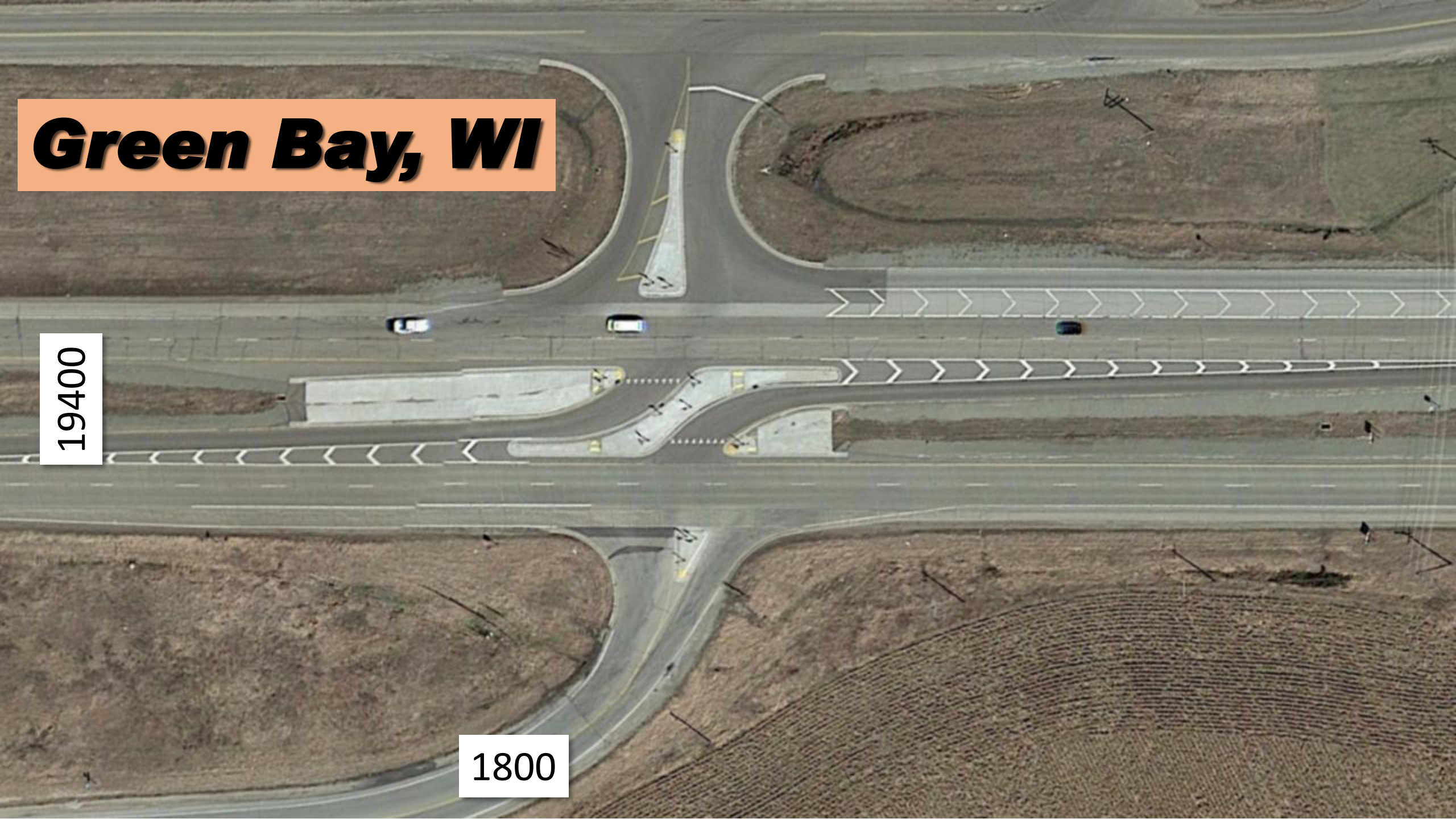
2300



Green Bay, WI

19400

1800



Green Bay, WI



Minnesota DOT:

- ***Injury crashes reduced by 60%***
- ***Fatal and incapacitating injury crashes reduced by 100%***

A Study of the Traffic Safety at Reduced Conflict Intersections in Minnesota



(Photograph courtesy of Bolton and Menk, Inc. 2013. Cologne, MN)

**Office of Traffic, Safety, and Technology
Minnesota Department of Transportation**



**Derek Leuer, PE
8/17/2015**

Questions?

Feedback?